**Objectives:** To create multi-table queries with calculations, grouped queries with totals, and crosstab queries.

1. Open the example database **Northwind 2007** supplied with *Access.* Under Microsoft Office Online, select Sample. Double-click Northwind 2007. You will be instructed to download the accdb file and all of its associated files, which you can alter if you wish. Work with this copy during the practical.
2. Open your **Northwind** database, Northwind.accdb. Follow the instructions to ‘Enable the content’. Accept the offer to be ‘Andrew Cencini’. Close the Form ‘Home’ and open the table **Order Details** which can be found within the **Supporting Objects.** Scroll round it to see what it contains. Your first queries will be based on this table. Close the table.
3. Create a **new** select query using the **Orders and Order Details** tables. (The two tables are already *related* by the numeric field **OrderID.)** The query should display ShipCity, OrderID and UnitPrice for those orders with a ShipCity of Chicago, Denver or Miami. **Save this as Query\_C**Describe the relationship between these two tables:
How can you tell that referential integrity is enforced?
4. This section takes you through the (bulleted) stages needed to create an example **Groups and Totals** query. You should inspect the datasheet view of your developing query after each stage.
You are creating a query that will display, **for each** shipper (Ship Via), the number of orders shipped.
* Use **Create 🡺 Query Design** to start your query off. Add the **Orders** table. Add the **Shipper ID** (**ShipVia)** field to the QBE grid**.**How many records does this retrieve (in the datasheet view)?
* Use the **Design** tab, **Totals** command or **Σ** button to add the Total row to the QBE grid. The Totals row should display **Group By.**How many records are displayed in the datasheet now?
(You should get one row for each of the shippers ie for each value of **ShipVia**. Open up the Orders table and study the lookup property for Shipper ID)
* Add the **OrderID** field to the QBE grid. The **Total** row for **OrderID** should display **Group By.**How many records are displayed in the datasheet now?
(Explanation: you are trying to group by the primary key, whose values MUST be unique to each row and are different for each row in the original table. You are creating groups of 1 record! **Note the records are grouped FIRST by the ShipVia field**)
* Change the **Totals** row for the **OrderID** field to **Count.** Inspect the datasheet again. Since **OrderID** has no missing values you have counted the number of records for each **ShipVia** group.
Why are there no missing values in the OrderID field?

**Save this as Query\_D**

1. What other options are available in the Totals row droplist?

Read *Queries 🡺 Introduction to queries 🡺* **Make calculations based in your data**and **Look at summarized or aggregate data** and also read through all the section*Queries 🡺 Count data by using a query* (4 sections).
2. Use the **Orders and Orders Details** tables to create a Groups/Totals query.
This should show for each shipper (Ship Via), the total quantity (of items ordered) for each employee. **Save this as Query\_F.**
What is displayed at the top of the quantity column in datasheet view?

 **Sign Off Point 1 of 2:**
 **Query\_C, Query\_D, part\_E & Query\_F and questions in those sections**.
 KEEP WORKING WHILE YOU WAIT.

1. **TO UNDERSTAND HOW THIS QUERY WORKS, CHANGE VIEWS AFTER EACH ACTION TO SEE ITS RESULT**
Use the **Orders** tables to create a single Groups/Totals query which shows **for each ship city,** the total number of orders **for each shipper**. The shipper with the largest number of orders should come at the top of the list.
What is displayed at the top of the total number of orders column in datasheet view?

In design view, use your right mouse button on this field to display the **Properties**. Set the **Caption** property to a more user-friendly name and change view to see the effect. You can also type the required heading directly into the field heading ensuring that you finish with a colon (:) before the Field name.
**Save this as Query\_G.**

## Crosstab queries

1. Crosstab queries are used to present the results of a Groups/Totals Query in a better way. Open **Query\_F** and use **File 🡺 Save As** 🡺 **Save Object As** to save it as **Query\_H**. Look at the layout of results in datasheet view, then change back to design view. Use the following stages to convert this query to a crosstab query.
* From the Query Tools; Design menu choose Crosstab Query.
* *You need only change the Crosstab row of the QBE grid*Set one field as a **Column Heading,** one as a **Row Heading** and the calculated total as **Value –** look at the result and change the row and column headings round if this would give a better layout
1. Open Query F in datasheet view. Note that the full name is displayed for the **Employee** and **Ship Via** fields in Query F. If you click in a cell, you see the arrow for a pull down list. The full data are being ‘looked up’ from other tables.
Compare this with the results with Query H. Note that the **row heading** field data displays as a looked up name. The **column heading** field reflects the true contents.
2. Open your query from **g).** Use **File 🡺 Save As** 🡺 **Save Object As** to save this as **Query\_J.** Remove the sort setting, then convert this to a crosstab query and save it.

## Calculations in queries

1. Create a new query and add the **Products** table to the Design view. Add the fields **Product Name, Quantity Per Unit, Standard Cost** to the QBE grid. Instead of adding another field at the top of the next column of the grid, type **1.86\*[Standard Cost]** in the ***Field*** cell. (This is the standard way of adding a calculated field to a query.)
Inspect the datasheet view to find the prices displayed in dollars (approximately) as well as in pounds.
Go back to design view and alter the default name **(Expr1 :)** supplied by *Access* for this calculated field to something more suitable. If you find the display format messy, a right-click in the relevant column in design view will give access to **Properties**
**Save this as** **Query\_K**
2. *Note that a product has a (recommended) Standard Cost (shown in product) but can be sold at a different Unit Price in Order Details dependant on the amount of discount given (special concessions are made to some customers). Use the Order Details Unit Price for this section.*
Use the **Order Details** table to prove this to yourself by creating a query that shows, *for each* product, its Unit Price. **Save this as Query\_LA.**Check this with your neighbour’s design

Keep working on this query and extend it so that it shows *for each* product, and *for each* unit price the total quantity of products shipped at that price. Check the result. **Use File 🡺 Save As** 🡺 **Save Object As to save this as Query\_LB**
Check this with your neighbour’s design.
*Note that an Order consists of a quantity of units sold at a given unit price. The Standard Cost is the cost for the units within the product. The quantity shows the number of units ordered.*
Extend this query again so that it now calculates the cost of the order to the customer (ignore the discount). Format this column appropriately.
**Use File 🡺 Save As** 🡺 **Save Object As** **to save this as Query\_LC**
3. Ensure you have copies of sample datasheets and QBE grids either using screen dumps or printed copies.
4. If you have time, investigate the Northwind database further. Look particularly at the *design* of tables, forms and queries. You are warned that this is a sophisticated example, and in places uses techniques that will not be covered in the course. In spite of this, you may find it worthwhile to look at how Northwind exploits each of the database techniques as they are covered in the practicals.

 **Sign Off Point 2 of 2:**
 **Query\_G + question, Query\_H, Query\_J, Query\_K and Query\_LA, Query\_LB, Query\_L\_C.**

1. **Remember to copy your work to the M drive. This will be a useful reference for your assignment work.**